

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 24

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte YOSHIO ABE

Appeal No. 95-4632
Application No. 08/184,675¹

HEARD: April 8, 1999

Before HANLON, OWENS, and SPIEGEL, Administrative Patent Judges.
SPIEGEL, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1 through 18, which are all of the claims pending in this application.

We REVERSE.

¹ Application for patent filed January 21, 1994.

BACKGROUND

The appellant's invention relates to a method of forming a thin film of a lead titanate ceramic on a substrate by reacting a lead carboxylate with a titanium (and optionally a zirconium) alkoxide in a suitable solvent, e.g., ethylene glycol monomethyl ether, to form a complexed lead (zirconate) titanate, dissolving the complexed lead (zirconate) titanate in water to form an aqueous solution, and immersing the substrate in the aqueous solution of complexed lead (zirconate) titanate where, as the complexed lead (zirconate) titanate is hydrolyzed by the water, heterogeneous nucleation and nuclear growth of the complexed lead (zirconate) titanate occur on the entire surface of the substrate to form the thin film of lead (zirconate) titanate (see e.g. specification page 6, first full paragraph and Brief, paragraph bridging pages 2-3). Claim 1 is illustrative of the subject matter on appeal and reads as follows:

1. A process of producing thin films of a lead titanate system expressed by the general formula: $\text{Pb}(\text{Zr}_x\text{Ti}_{1-x})\text{O}_3$, where $0 \leq x < 1$, said process comprising the step of: (a) preparing a complex alkoxide including at least lead and titanium atoms by a liquid phase reaction of lead carboxylate with titanium alkoxide and optionally also zirconium alkoxide, (b) dissolving the resultant complex alkoxide in water to prepare an aqueous solution of the complex alkoxide, and (c) immersing a substrate in the resultant aqueous solution to deposit a thin film of the lead titanate system on said substrate by hydrolysis of said complex alkoxide.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Pebler et al. (Pebler)	4,485,094	Nov. 27, 1984
Nanao et al. (Nanao)	4,668,299	May 26, 1987

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Nonaka et al. (Nonaka)	4,920,093	Apr. 24, 1990
Chen et al. (Chen)	5,072,035	Dec. 10, 1991
Matsuki et al. (Matsuki) ² (Japanese Kokai)	1-260870	Oct. 18, 1989

Vest et al., (Vest) "Synthesis of Metallo-Organic Compounds for MOD Powders and Films,"
MRS Proceedings, Symposium L, Boston, MA, Dec. 2-4, 1985, pages 1-10.

ISSUES³

The issues presented for review are: (1) whether the examiner erred in rejecting claims 1, 2, 6-9 and 14 under 35 U.S.C. § 103 as being unpatentable over Pebler in view of Vest and Chen, (2) whether the examiner erred in rejecting claims 3-4, 10, 11, 13, 15 and 16 under 35 U.S.C. § 103 as being unpatentable over Pebler in view of Vest and Chen as applied to claims 1, 2, 6-9 and 14 above, and further in view of Nanao, and (3) whether the examiner erred in rejecting claims 5 and 12 under 35

² Our consideration of this reference is based on an English translation thereof, a copy of which is provided to appellant with this decision.

³The final rejection of (i) claims 1, 2, 6-9 and 14 under 35 U.S.C. § 103 as unpatentable over Pebler in view of Vest, (ii) claims 3, 4, 10, 11, 13 and 15-18 under 35 U.S.C. § 103 as unpatentable over Pebler in view of Vest and further in view of Nanao, and (iii) claims 5 and 12 under 35 U.S.C. § 103 as unpatentable over Pebler in view of Vest and further in view of Matsuki and Nonaka does not appear in the examiner's answer and the examiner has not indicated the status of these rejections. Accordingly, the rejections are assumed to have been withdrawn. *Ex parte Emm*, 118 USPQ 180, 181 (Bd. App. 1957).

Although Chen was not relied on in the final rejections of claim 1-18, appellant not only presumed that Chen should have been relied on but also fully addressed Chen in the Brief as to each of the three "ISSUES" above (see pages 5-11). Consequently, there appears to be no prejudice to appellant in deciding the appeal on this record.

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U.S.C. § 103 as being unpatentable over Pebler in view of Vest and Chen as applied to claims 1, 2, 6-9 and 14 above, and further in view of Matsuki and Nonaka.

DELIBERATIONS

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification and claims, to the applied prior art references, and to the respective positions articulated by the appellant and the examiner. We make reference to the examiner's answer (Paper No. 14, mailed June 22, 1995) for the examiner's complete reasoning in support of the rejections, and to the appellant's brief (Paper No. 13, filed April 26, 1995) for the appellant's arguments thereagainst.

On consideration of the record, including the above-listed materials, we **reverse** all three of the examiner's prior art rejections.

DISCUSSION

1. Rejection of claims 1, 2, 6-9 and 14 as unpatentable over Pebler in view of Vest and Chen

Independent claim 1 on appeal recites a method of forming a thin film of a lead titanate ceramic on a substrate wherein, after forming a complex alkoxide from precursor source compounds, *the complex alkoxide, i.e. complexed lead (zirconate) titanate, is dissolved in water to prepare an aqueous solution of the complex alkoxide*, into which aqueous solution a substrate is then immersed.

The Pebler reference is insufficient to support a conclusion of obviousness of claims containing the limitation of dissolving the complex alkoxide *per se* in water to form an aqueous solution.

Pebler discloses a method of forming a continuous mixed oxide thin film by (1) preparing a composition of (a) precursor source compounds, i.e., an alkoxide source of one of the metals in the mixed metal oxide and a chelate source of a second metal in the metal oxide, (b) sufficient solvent, e.g. dimethyl formamide, to solubilize the sources of all the metals in the mixed metal oxide, and (c) about 1 to about 2 moles of water per mole of mixed metal oxide (column 3, lines 3-9 and 27-32); (2) applying the composition to a substrate (column 3, lines 36-37); and (3) heating the composition at at least 500EC (column 3, lines 48-52)

to oxidize the compounds in the composition to the mixed oxide, and to evaporate the solvent and organics which are present. (emphasis added, column 3, lines 52-55)

Although Pebler discloses adding water to a composition comprising the individual precursor or "source" compounds used to form the complex alkoxide, i.e., Pebler's "mixed oxide", Pebler does not disclose or suggest dissolving the mixed oxide *per se* in water to form an aqueous solution of mixed oxide. According to Pebler, the mixed oxide is actually formed during heating step (3) by an oxidation reaction. Thus, not only does Pebler not appear to disclose or suggest adding water to the mixed oxide complex *per se*, but it also would appear that any water which might have been present while the mixed oxide of Pebler was being formed *by heating* the composition comprising the precursor "source" compounds *to at least 500EC* would have been evaporated, i.e. removed, by such heating

temperatures. The examiner has not explained how adding water to Pebler's composition of precursor compounds and organic solvent would have disclosed or suggested dissolving Pebler's mixed oxide *per se* in water to form an aqueous solution (Answer paragraph bridging pages 8-9). Neither Vest nor Chen appear sufficient to remedy this deficiency in Pebler. Clearly, the examiner does not rely on either of these two secondary references to disclose or suggest the required step of dissolving the mixed oxide *per se* in water to form an aqueous solution of mixed oxide. Therefore, based on this record, we conclude the examiner has failed to establish a *prima facie* case of obviousness in regard to the subject matter as a whole. 35 U.S.C. § 103(a).

2. & 3. Rejection of claims 3-4, 10, 11, 13, 15 and 16 as unpatentable over Pebler in view of Vest and Chen as applied to claims 1, 2, 6-9 and 14 above, and further in view of Nanao.
Rejection of claims 5 and 12 as unpatentable over Pebler in view of Vest and Chen as applied to claims 1, 2, 6-9 and 14 above and further in view of Matsuki and Nonaka.

Since all the limitations of independent claim 1 are not disclosed or suggested by the applied prior art of Pebler, Vest and Chen under 35 U.S.C. § 103, we will not sustain the rejection of dependent claims 3-5, 10-13, 15 and 16.⁴ Dependent claims are nonobvious under

⁴ We have also reviewed the (a) Nanao, (b) Matsuki and Nonaka references additionally applied in the rejection of dependent claims (a) 3-4, 10, 11, 13, 15 and 16 and (b) 5 and 12, respectively, but find nothing therein which makes up for the deficiencies of Pebler, Vest and Chen discussed above regarding claim 1.

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§ 103 if the independent claims from which they depend are nonobvious. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988).

For these reasons, we do not sustain any of the examiner's rejections of claims 1-18 under 35 U.S.C. § 103 as unpatentable over any combination based on Pebler.

CONCLUSION

To summarize, (1) the rejection of claims 1, 2, 6-9 and 14 under 35 U.S.C. § 103 as being unpatentable over Pebler in view of Vest and Chen is **reversed**, (2) the rejection of claims 3-4, 10, 11, 13, 15 and 16 under 35 U.S.C. § 103 as being unpatentable over Pebler in view of Vest and Chen as applied to claims 1, 2, 6-9 and 14 above, and further in view of Nanao is **reversed**, and (3) the rejection of claims 5 and 12 under 35 U.S.C. § 103 as being unpatentable over Pebler in view of Vest and Chen as applied to claims 1, 2, 6-9 and 14 above, and further in view of Matsuki and Nonaka is **reversed**.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

REVERSED

ADRIENE LEPIANE HANLON)	
Administrative Patent Judge)	
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)	
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)	BOARD OF PATENT
TERRY J. OWENS)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
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CAROL A. SPIEGEL)	
Administrative Patent Judge)	

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OSTROLENK, FABER, GERB & SOFFEN
1180 Avenue of the Americas
New York, NY 10036-8403

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APJ SPIEGEL

APJ HANLON

APJ OWENS

DECISION: **REVERSED**

Prepared By:

DRAFT TYPED: 11 Jan 00

FINAL TYPED: